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WILD OAT CONTROL

BY

CULTURAL METHODS



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Wild Oat Control by Cultural Methods

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The Wild Oat is one of the most common and troublesome weeds in the Prairie Provinces. It causes a greater reduction in farm income than any other weed. As the wild oat is a member of the grass family, it cannot be controlled with 2, 4-D, or with any of the other selective weed killing chemicals now available. Cultural and cropping methods, therefore, present the only approach to a solution of the wild oat problem. The growing plant is quite similar, in appearance, to the cultivated varieties. For this reason, many people are led to believe that the wild oat should be easy to control. Actually, there are wide differences in the growth habits of wild and cultivated oats. In order to plan an effective wild oat control program it is necessary to know these differences, and to consider them carefully.

Some of the more important characteristics of the wild oat which must be considered in planning a control program are as follows:

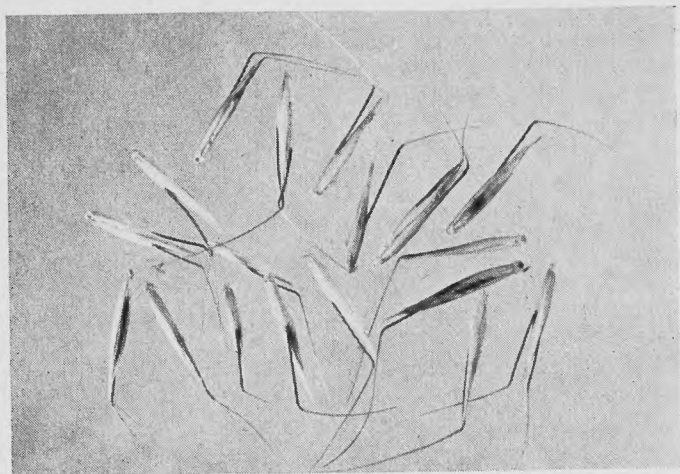
- I. Early Ripening and Shattering of Seeds.
- II. Dormancy of Seeds.
- III. 'After-ripening' of Seeds.
- IV. Temperatures at Which Seeds Germinate.
- V. Ability of Pieces of Seedling Plants to Grow.
- VI. Ability of Immature Plants to Produce Viable Seeds.
- VII. Viability of Seeds Buried in the Soil.
- VIII. Ability of Seeds to Survive Digestion by Animals.

I—EARLY RIPENING AND SHATTERING OF SEEDS

The early ripening and shattering habit of the wild oat results in a large percentage of the seed it produces falling to the ground before most cereal crops are ready to harvest. These seeds are a serious source of infestation. The remaining portion of the wild oat crop is threshed with the grain. Unfortunately, such grain is often used for seed without cleaning to remove the wild oat seeds.

II—DORMANCY OF WILD OAT SEEDS

The dormancy, or resting period, of wild oat seeds has been demonstrated through tests made under controlled conditions in the laboratory. These tests have clearly indicated that wild oat seeds gathered immediately after shattering, will not grow. In fact, seeds gathered at this time and placed under moist, cool conditions for several months did not germinate; nor did they show any signs of decomposition. The same seeds, however, when thoroughly dried and then placed under moist, cool conditions, germinated readily.



WILD OAT SEEDS

III—"AFTER-RIPENING" OF SEEDS

The 'after-ripening' of the wild oat seed seems to be closely associated with the drying of the seed. Certain important changes apparently take place within the seed as it dries, but these are not clearly understood. The seeds of the wild oat plant often contain as high as 32% moisture when they shatter and fall to the ground. Until the seed has dried and after-ripened, it will not germinate. Weather conditions and soil moisture conditions following the shattering of the seed, will determine the length of time required to after-ripen the current season's crop of seed.

Light fall cultivation has proved beneficial in promoting a good growth of wild oats in the following spring. Delaying fall cultivation will allow more wild oats to "after-ripen"; providing of course that drying weather occurs. Seeds that do not after-ripen following harvest are usually buried by fall or early spring cultivation, and unless the soil becomes very dry, remain dormant until again brought to the surface by further cultivation. Drying in either case completes the 'after-ripening' process. They are then in a condition to germinate and grow when soil moisture and temperature conditions are favourable.

IV—TEMPERATURES AT WHICH SEEDS GERMINATE

According to laboratory tests, wild oat seeds germinate best at a temperature below 50° F. In fact, few will germinate at soil temperatures above 50° F. This explains why wild oats grow so readily in a summerfallow field until about the 1st to 15th of June, with few growing after that date.

Cultivation after the soil reaches a temperature of 50° F. in the fallow year serves only to bring the wild oat seeds in the soil to the surface, where they are dried out and 'after-ripened.' The higher temperatures of the soil during the summer, however, prevent germination. Repeated cultivations bring more seeds to the surface to be 'after-ripened,' with the result that at the end of the fallow season, a great quantity of wild oat seeds in the soil are ready to grow. This helps to explain the disappointing results so often obtained where an attempt is made to control wild oats by the summerfallow method.

V—ABILITY OF PIECES OF SEEDLING PLANT TO GROW

Experimental evidence has shown that if the seedling wild oat plant is cut into pieces, the pieces containing nodes are capable of establishing roots, and producing normal plants. For this reason, it is usually advisable to delay cultivation of wild oat infested fields until the plants are about five inches high, or in the four-leaf stage.

VI—ABILITY OF IMMATURE PLANTS TO PRODUCE VIABLE SEEDS

Wild oat plants harvested when the first kernels are only 4 to 6 days out of the sheath, will produce viable seeds. This factor is important where green feed is grown as a cleaning crop. If an infested green feed crop is not harvested as soon as the wild oats begin to head, many viable wild oat seeds will be produced.

VII—VIABILITY OF SEEDS BURIED IN THE SOIL

Wild oat seeds buried in the soil will remain viable for several years. Cases are on record where infested land, after being under grass or clover for periods up to seven years, still contained a serious infestation of wild oats.

VIII—ABILITY OF SEED TO SURVIVE DIGESTION BY ANIMALS

The wild oat seed will pass through the digestive tract of an animal, and still germinate readily. Therefore, grain or green feed sheaves containing wild oats, which are fed to livestock, may be an important source of infestation. Consequently, animals fed on such material should not be allowed to roam over the farm.

NO CHEMICAL CONTROL

Many different chemicals have been tested in the past few years in an attempt to find a selective herbicide which would control wild oats. Some have given reasonably good results under certain conditions but none so far developed are sufficiently effective to be recommended for general use.

The search still goes on, however, and hundreds of new chemicals are being tested each year. It is almost certain that some day an efficient, economical chemical will be produced which will control wild oats selectively.

Cultural Practices in Wild Oat Control

THE USE OF FERTILIZERS

Commercial fertilizers have a place in the wild oat control program. Increasing the speed of growth of the cereal crop through the use of fertilizers gives it an advantage over the wild oat, and assists the crop greatly in competing with this pest. As the fertilizer is usually seeded with the grain in the drill row, it is of little benefit to the wild oat plants growing between the rows. A fertilized crop, therefore, is likely to give stronger competition to wild oats than a crop which has not been fertilized.



NOT FERTILIZED

FERTILIZED

POST-SEEDING OR AFTER-SEEDING CULTIVATION

The common cereals develop more rapidly during the early stages of growth than does the wild oat. If a fast-growing crop, such as barley, is seeded to a depth of 3 to 3½ inches, preferably with fertilizer, it is possible to shallow-cultivate after seeding without injury to the barley. The cultivation should be done

when the sprout on the barley seed is not more than one inch long. It must be shallow in order to leave the barley seed undisturbed. This will kill many wild oats which have germinated near the surface, and will allow the barley to become firmly established, before a further crop of wild oats can get started. The rod weeder is the best implement to use for post-seeding cultivation. However, if no rod weeder is available, either the drag harrow or wire weeder will be found useful in killing wild oats and many other small weeds.

FALL GRAINS

Fall rye, in areas where it grows satisfactorily, is an excellent competitive crop with which to combat wild oats. It begins growth very early in the spring, and if a good stand is obtained, few wild oats will persist in it. Fall wheat has also been used to good advantage in controlling wild oats, but the competition afforded by this crop is not as great as provided by fall rye.

BURNING STUBBLE

Some farmers believe that burning stubble in the fall will destroy many wild oats. Experimental evidence disproves this theory. A certain amount of injury to the seed coat occurs through burning, and, as a result, some wild oats may germinate before freeze-up. These, of course, will be killed by fall frosts, and will reduce somewhat the infestation of wild oats the next season. The advantage gained, however, is far outweighed by the loss of fibre and organic matter which are badly needed in most of our prairie soils.

FORAGE CROPS

It has already been mentioned that wild oats will remain viable for many years in the soil of a field sown to forage crops. On the other hand many wild oats, near the surface may germinate. If the resulting plants are harvested with the forage crop before they mature seeds the infestation may be considerably reduced. The following points are important where forage crops are used in wild oat control.

- (1) Wild oats should not be allowed to go to seed in a forage crop.
- (2) When the field is broken up, plow early and summerfallow the land thoroughly.
- (3) Kill as many crops of weeds as possible before seeding the land the next spring.
- (4) Use late-seeded, early-maturing barley, rather than wheat, the first year following the breaking of grass land. Barley will help complete the cleaning up process, while wheat may cause a setback.

THE KEY TO WILD OAT CONTROL

From the above discussion of the wild oat, it is evident that summerfallowing is not an effective means of control. In fact,

in many instances, the stirring of the soil during the fallow year, merely serves to bring wild oat seeds to the surface where they are 'after-ripened.' This results in an increased infestation in the field the following year. Where a crop is seeded early, under these conditions, the results are often disastrous. If, on the other hand, the seeding of a crop is delayed until early June, many wild oat seeds in the soil will have germinated and can be destroyed by cultivation. It has been clearly established that more wild oats can be killed by spring cultivation and delayed seeding than any other method.

How to handle an infested field:

1. A light cultivation in the fall to cover wild oat seeds so as to promote early spring growth.
2. A light cultivation in the spring to warm up the soil and promote germination.
3. Cultivate as often as necessary to kill weeds until early June. The last cultivation should be thorough in order to kill all wild oats and other weeds growing in the field.
4. Seed immediately to an early maturing crop such as an early barley or oats for green feed.
5. Use fertilizer, if possible, to speed growth and promote early maturity.

A bad infestation cannot be controlled in one year. There may be several bushels of wild oats per acre in the soil. At the Experimental Farm, Lacombe, Alberta, it was found that one field contained 70.7 bushels of wild oats per acre.

The delayed seeding method, as described above, was tested on this field. Olli barley seeded on June 2nd, with fertilizer, was practically free of wild oats. Another part of the same field seeded on May 17th, was polluted.

With a heavy infestation of wild oats in the soil, it may take several years to complete the eradication program. Remember, however, that timely and thorough cultivation, together with careful planning of the cropping program, will effectively control wild oats.

HOW TO KEEP YOUR FARM FREE OF WILD OATS

1. Sow only seed which is free from wild oat seeds.
2. Cultivate shallowly in order to keep the wild oat seeds near the surface, where they will 'after-ripen,' grow, and can be destroyed.
3. Cultivation must be timely, and thoroughly carried out.
4. Remember that the wild oat ripens and shatters its seed before most of the common cereals are ready to harvest.
5. Use early maturing barley, or fall rye as competitive crops.
6. The early seeding of wheat on infested fallow land is often disastrous.
7. Do not allow livestock, which are fed material containing wild oats, to wander over the farm.

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